

## Development of FIR Arrays With Integrating Amplifiers

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We describe the development of optimized photoconductor arrays suitable for far infrared space astronomical applications. Although the primary impetus is the production of a 16 by 16 element Ge:Ga demonstration array for SIRTf, we consider the extension of this technology to LDR. The optimization of Ge:Ga and Ge:Be photoconductor materials is discussed. In collaboration with Lawrence Berkeley Laboratory, we present measurements of FIR photoconductors with quantum efficiencies greater than 20% at 100  $\mu\text{m}$ , and dark currents below 300 electrons/s.

Integrating J-FET amplifier technology is discussed. The current generation of integrating amplifiers has a demonstrated read noise of less than 20 electrons for an integration time of 100 s. We show the design for a stackable 16 x n Ge:Ga array that utilizes a 16-channel monolithic version of the J-FET integrator. A novel part of the design is the use of a thin, thermally insulating substrate that allows the electronics to operate at the optimum temperature of 50 K while maintaining thermal and optical isolation from the detectors at 2 K. The power dissipation for the array is less than 16 mW. The array design may particularly be applicable to high resolution imaging spectrometers for LDR.

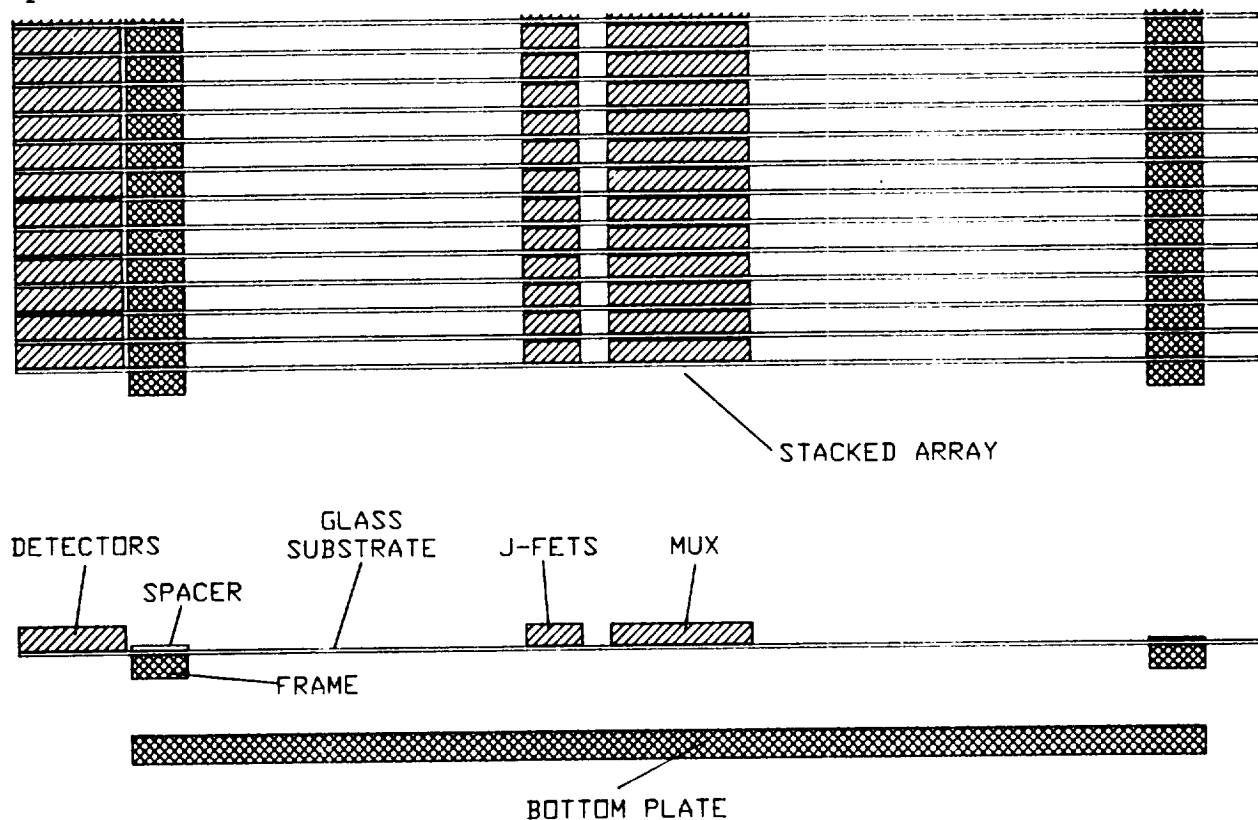


FIGURE 1. J-FET

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